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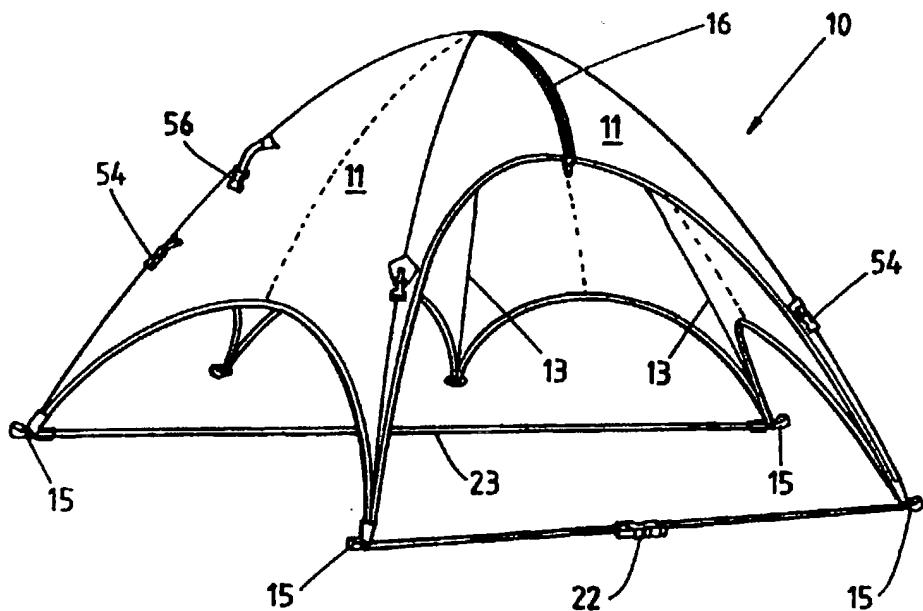


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(54) Title: FOLDABLE SHELTER



(57) Abstract

A foldable shelter (10) has two arch-shaped portions (11) each of flexible fabric such as woven nylon, and these contain pockets (13) which house flexible fibreglass reinforced rods (12) which intersect at a central location where the two portions (11) are permanently joined, but upon erection zip fasteners (16) join abutting edges of the portions (11) to create an igloo-like shape. The product is inexpensive, can be folded into a small carry bag, and erected or folded in a very short time.

(26)

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### FOLDABLE SHELTER

This invention relates to a shelter which can be folded into a relatively small pack and which can be quickly and easily erected or refolded.

#### PRIOR ART

Foldable shelters such as beach shelters are, of course, well known, and in most instances the prior art shelters known to the Applicant have involved rigid bars or poles. For example, it is quite common to have a pyramid shape shelter with a central post from which the sides slope outwardly, to be secured close to the ground. In case of a strong wind, the side or sides which face the wind tend to swivel about their ground anchor points, and impart a moment to the top of the central post which tends to cause it to collapse. Such shelters, however, are cumbersome and unwieldy because of the required stiffness of the post.

It is also known to have shelters such as one-man or two-man tents, wherein use is made of flexible stiffening rods. These need to be dismantled, but are not suitable for withstanding very high winds blowing transversely to the longitudinal direction of the shelter.

Other prior art disclosed by a search include:

U.S. Patent 5,274,980 - World Shelters Inc., wherein a collapsible canopy structure includes a support framework having telescopic legs, scissor units and tension cables, which can be in an erected or collapsed mode.

A flexible canopy is supported by the framework when erected;

U.S. Patent 4,621,653 - Aquino, wherein a sandshell umbrella having sheet side walls supported by S-shaped struts which are foldable about a middle portion;

U.S. Patent 4,241,745 - Knox, wherein a shelter has semi-rigid foldable material which, upon erection, includes a conical shaped top covering, and a triangular floor section;

U.S. Patent 3,874,398 - Hendrickson, wherein base frame members and header frame members can be folded to produce a compact bundle. A tent of generally rectangular form has a central loop which engages the header frame, and loops tie the bottom of the tent in position.

#### BRIEF SUMMARY OF THE INVENTION

With the object of providing a shelter which has considerable stability but still can use flexible stiffening rods, and furthermore can readily fold into a relatively small pack, in one embodiment of the invention, a shelter comprises two fabric portions each independently foldable of the other, and connected to

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the other by means of a plurality of flexible stiffening rods each of which is continuous through pockets in both the fabric portions. In its erected state, contiguous edges of the fabric portions are joined, and the rods are deformed to semi-circular shapes, so that the shelter occupies a generally hemispherical shape.

This invention, in having continuous stiffening rods, reduces or completely avoids the need for a central post, and by having the guy straps extend from the wall compensate for the effect of wind loading on the walls of the shelter.

It is a further feature of an embodiment of this invention that the two portions of the shelter are joined with fasteners, for example zip fasteners which are either continuous or are located end to end, and this greatly facilitates the packaging.

#### BRIEF SUMMARY OF THE DRAWINGS

An embodiment of the invention, and its mode of erection, is described hereunder in some further detail with reference to and is illustrated in the accompanying drawings in which:

Fig 1 is a perspective view of a shelter in its erected state;

Fig 2 is a top view of same;

Fig 3 is a front view of same;

Fig 4 is a perspective view of the shelter in its partly unfolded state, after having been removed from a circular carrier;

Fig 5a is a fragmentary "exploded" view, drawn to a larger scale, and showing a base connection of a flexible stiffening rod;

Fig 5b is a central section through the base connection;

Fig 6a depicts an end of a flexible stiffening rod about to be inserted in a pocket of a fabric portion;

Fig 6b is a fragmentary underside view showing the intersection of the rods and fabric portions before erection;

Fig 7a is a perspective view illustrating release of one of two end groups of rods, from the intersection of the fabric portions, prior to erection;

Fig 7b shows release of one of two binding straps intermediate the ends of one of the fabric portions, prior to erection;

Fig 7c shows in perspective the tying of adjacent ground engaging rod ends by two ground straps, during erection;

Fig 7d shows in perspective the first stage of joining two contiguous edges of fabric portions upon erection; and

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Fig 7e illustrates, in perspective, the attachment of a guy strap, to stiffen the shelter against wind forces (if necessary).

In this embodiment, a foldable shelter 10 comprises two portions 11 of flexible fabric material, and these are stiffened by three flexible rods 12 formed from fibreglass reinforced plastics (Figs 5 and 6), each flexible rod extends through pockets 13 on the inner surfaces of the portions 11, and as illustrated in Fig 6b, they intersect at a central location between the portions. Each rod passes through pockets 13 in both portions 11, and terminates in foot assemblies 15 as best seen in Figs 5a and 5b.

Each of the portions 11 is provided with releasable fastening means 16, in this embodiment being rugged zip fasteners, and when both zip fasteners are engaged, the edges of the portions 11 become fastened and retained in two pairs, the edges of each pair being held contiguous by the respective fasteners. The shapes of the portions 11 include generally triangular panels as shown best in Figs 1, 2 and 3, being scalloped at their lower edges, and the circumference surrounding the lower edges is such that when the fasteners 16 retain the edges contiguous, the three dimensional shape of the shelter takes place, with the rods providing six legs, each terminating in a foot assembly 15. As best seen in Fig 6b, the rods intersect at the central location of the shelter, and in passing through the pockets 13, retain the two portions together but allow independent folding of the portions 11.

Also as shown in Fig 6b, there are provided female buckle sockets 19, at the central location, and as seen in Figs 4 and 7a, these receive male buckle inserts 20 which are secured to respective ends of the two portions 11, so that upon folding as seen in Fig 4, form each portion 11 into respective loops when the buckles are engaged.

There are also provided a pair of ground straps 22 and 23 (Fig 1), the ground strap 22 having a central buckle extending between the foot assemblies 15 at the locality of the shelter access opening 24, or the ground strap 23 extends between diametrically opposite foot assemblies 15 substantially parallel to the ground strap 22, also being releasable by at least one buckle.

Fig 1 also illustrates a carry bag 26 which comprises one generally circular panel 27 to which the curved periphery of a second panel 28 is secured to define a pocket, and the semi-circular panel 28 is provided with a T-shaped zip fastener 29 which is engagable with triangular flaps 30 to close the pocket defined between the panels 27 and 28. The flaps 30 are illustrated in Fig 4 in their open position.

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Reference is now made to Figs 5a and 5b. A foot assembly 15 is shown, and the foot assembly 15 comprises walls 34 which define a hollow cylindrical opening 35 which receives the lower end of a flexible rod 12, and the rod is permanently secured by an adhesive. The socket wall 34 terminates at its lower end in a downwardly directed spigot 36, and the lower end of the spigot has releasably secured to it a closure member 37, securing being effected by a split pin 38.

The lower ends of the outer portion 11 and its pocket 13 are provided with respective eyelets 40 which surround the spigot 36, and carry a retaining loop 41 which extends to one side of the foot assembly 15, while at the other side there is provided a further male insert 42. This is associated with a female socket 43 of the ground strap 22 referred to above, and a somewhat similar arrangement is used for the ends of the ground strap 23. The loop 41 can receive a retaining peg, and the function of the ground straps is described hereunder.

The following is a brief description of the main steps taken in the erection of the shelter 10:

Assuming the two portions 11 of the flexible fabric are separated from one another, and are folded together with the male inserts 20 at their ends to be retained in sockets 19, the two portions will be seen from Fig 4 to then be foldable one on top of the other, and these are contained in the carry bag 26. The zips 29 are released, and the flaps 30 are folded outwardly as shown in Fig 4. In this stage, the folded portions 11 can be withdrawn from the circular carry bag, and the male portions 20 can be released from the sockets 19 so that the two portions can have their ends with the male inserts separated, as partly shown in Fig 4. This stage is also shown in Fig 7a, where one of the inserts 20 is shown removed from its socket 19 and the other still not removed, corresponding to the state which exists in Fig 4.

Fig 7b then shows the next stage, and press studs 46 are released, allowing the binding straps 47 to be "undone" from the central parts of the now separate portions of the fabric 11.

Fig 7c then shows the next stage, wherein the two ground straps 22 and 23 join the respective foot assemblies 15, and in so doing cause flexure of the stiffening rods 12 into an arched or part-circular shape.

At that stage, the central locality of the shelter will be above ground level, and as shown in Fig 7d, the releasable zip fastener 16 can again be joined to bring together edges 49 and 50 and retain them contiguous with one

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another, thus substantially completing the erection procedure. This will be seen to be exceedingly simple and can be effected in a matter of seconds, much less than a full minute.

The erected shelter can then be secured by means of ground pegs (not shown) being driven through the loops 41 (Fig 5a) into the ground and in addition, or in the alternative, guy straps 52 (Fig 7e) can have respective male buckle inserts 53 inserted into female sockets, the lower ends of the guy straps 52 being anchored by ground pegs 55.

Fig 1 illustrates a short strap 56 on one of the portions 11, and when the shelter is fully folded, that strap 56 engages a second strap (not shown) on the other portion 11 through a further buckle, to thereby retain two loops together before inserting in carry bag 26. Consequently, upon erection, a first step is to release the straps 56 from one another, so that the loops become disengaged, as illustrated in Fig 4.

Chordal shaped infill panels (not shown) may be used to fill the spaces between the scalloped edges and the ground, these being attached or removed by use of touch-and-hold strips, or other easily manipulated fasteners.

It has been found that this invention satisfies the object of providing a shelter with considerable stability, a shelter which can fold into a relatively small pack, wherein the guy straps can compensate for the effect of wind loading on the walls of the shelter without the need for any rigid poles or other cumbersome or awkward components. Extensive use of the male/female buckle arrangements is found to greatly facilitate the erection and the folding of the shelter.

**THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:**

1. A foldable shelter comprising two portions each having sheets of flexible fabric, a plurality of flexible rods each extending through both said portions and intersecting at a central location between said portions, retaining means which retain said rods to said fabric sheets, at least two releasable fastening means extending along edges of said fabric sheets which, upon fastening said edges, retain edges in two pairs, said edges of each pair being contiguous, and also retain said sheets in an erected state, but upon release, allow separation of said portions except at said central location whereupon said shelter becomes foldable to a packaging state.
2. A foldable shelter according to claim 1 wherein the flexible fabric has an inner surface, said retaining means comprising pockets through which said flexible rods extend.
3. A foldable shelter according to claim 2 wherein said releasable fastening means comprise zip fasteners extending along edges of said fabric sheets which become contiguous upon erection of said shelter.
4. A foldable shelter comprising two portions each having sheets of flexible fabric, a plurality of buckle portions at a central location attached to said flexible fabric, a corresponding plurality of co-operable buckle portions at the ends of each portion which, when engaged with the first said buckle portions, form the two portions into respective loops, at least two releasable fastening means extending along edges of said fabric sheets which, upon fastening said edges, retain edges in two pairs, said edges of each pair being contiguous, and also retain said sheets in an erected state, but upon release, allow separation of said portions except at said central location whereupon said shelter becomes foldable to a packaging state.
5. A foldable shelter according to claim 4 wherein said sheets of flexible fabric are arranged in triangular panels which have a scalloped shape along their lower edges when erected.
6. A foldable shelter according to claim 4 wherein each said flexible rod terminates at its ends in a foot assembly, and further comprising two ground straps, one of said ground straps extending across an opening between said portions of flexible fabric which is an access opening upon erection of said shelter, and secured at its ends to respective said foot assemblies which lie at the base of said opening to draw those said foot assemblies towards each other but being releasable, and the other said ground strap extending between other of said foot assemblies which are diametrically

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opposite one another to draw those said foot assemblies towards each other, but also being releasable.

7. A foldable shelter according to claim 4 further comprising foot assemblies on respective ends of each said flexible rod, each said foot assembly having an upper portion with walls which define a hollow cylindrical opening in which a respective end of a said rod is permanently secured, and also having a downwardly directed spigot terminating in an annular closure member retained thereto by pin means.

10 8. A foldable shelter according to claim 7 wherein each said foot assembly further comprises eyelets which surround said spigot and are located between said upper portion and said annular closure member, some of said eyelets retaining fabric sheets at their at the lower most points of said shelter when erected a plurality of straps, and other of said eyelets retaining ends of said straps.

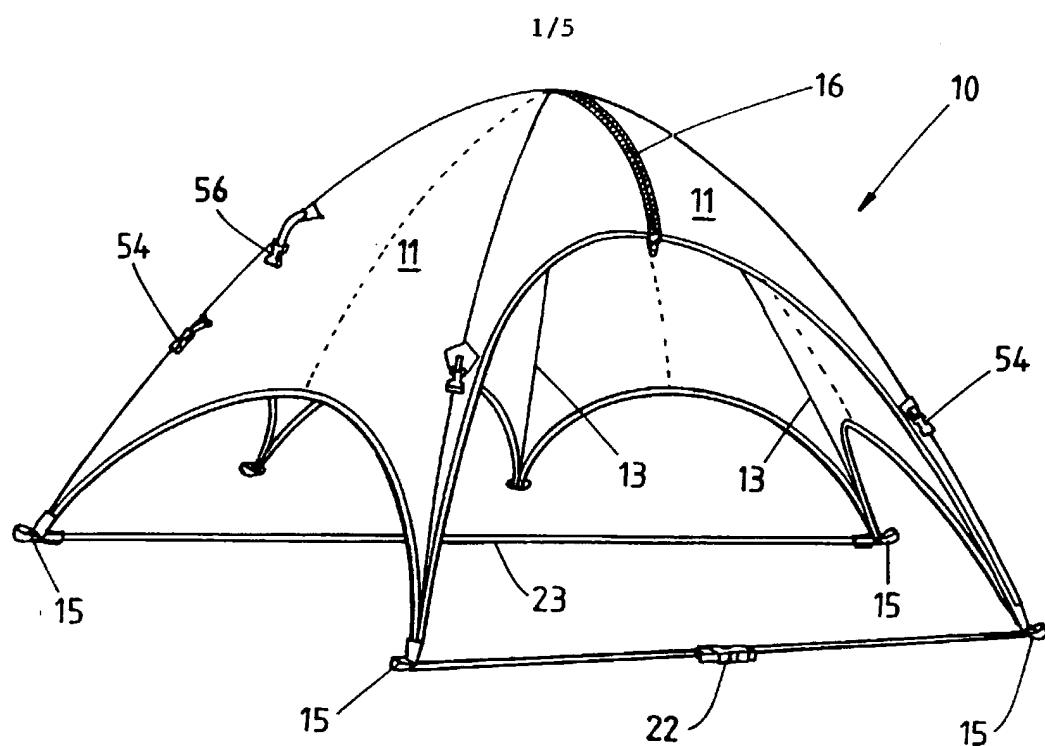
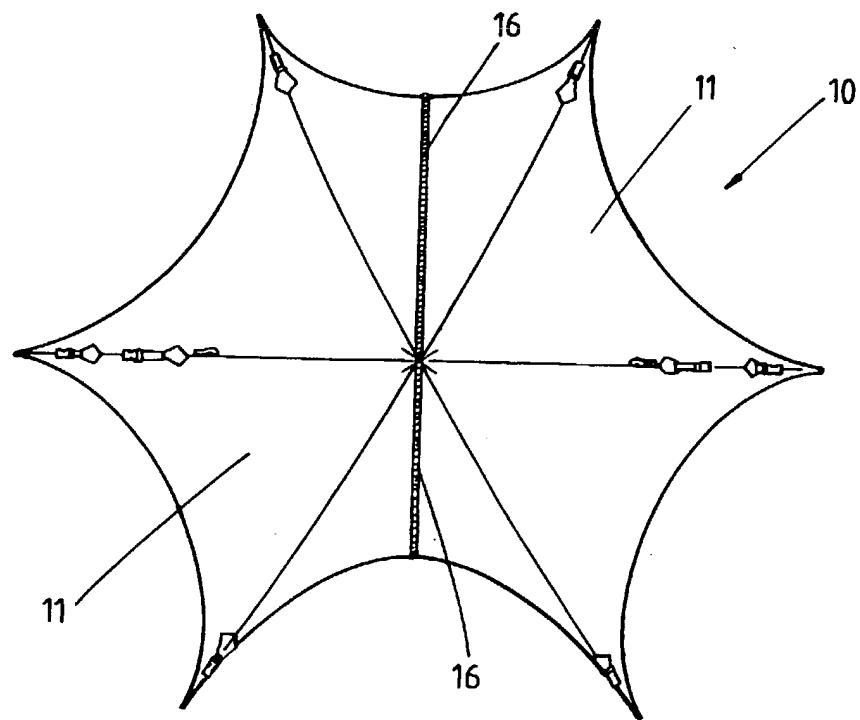
15 9. A foldable shelter according to claim 4 further comprising guy straps releasably engaging outer surfaces of said flexible fabric at localities between ends of said rods.

10. A foldable shelter according to claim 4 in combination with a carry bag comprising two panels of flat circular shape and provided with an 20 access opening closable by at least one flap,

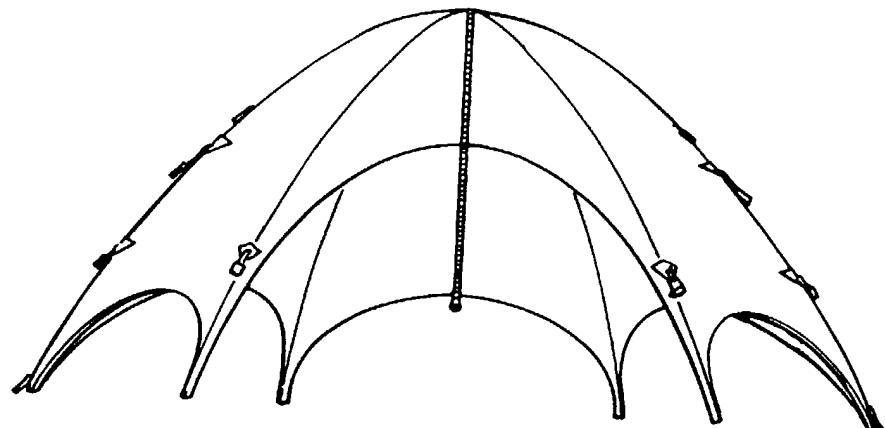
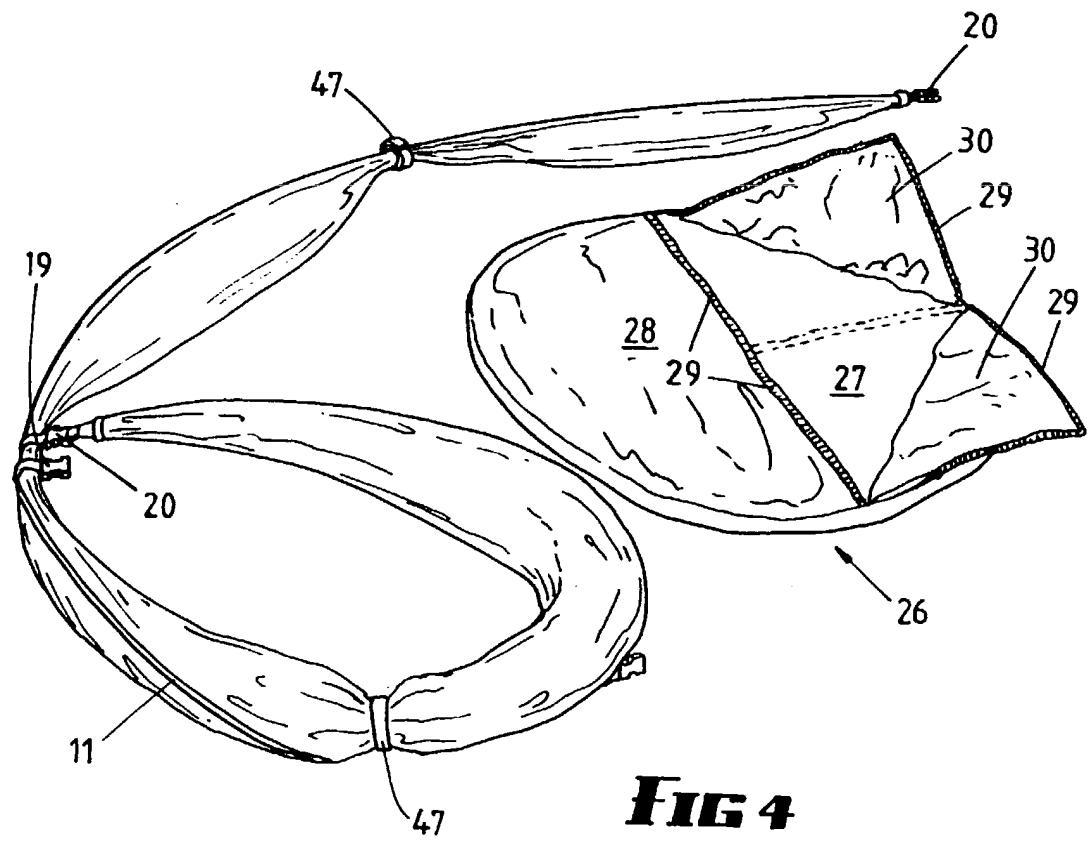
said carry bag being of shape and size that when said foldable shelter is formed into said respective loops, said loops are insertable in said carry bag and removable therefrom upon opening of said flap.

11. A method of erection of a foldable shelter which is in 25 accordance with claim 6 comprising:

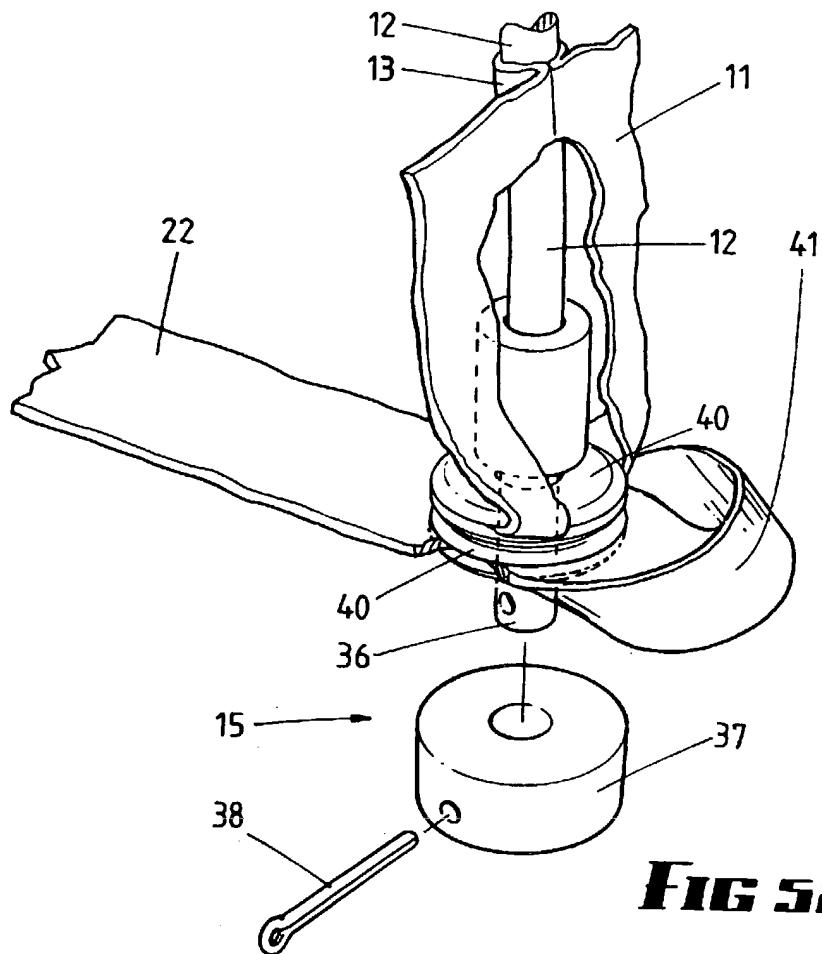
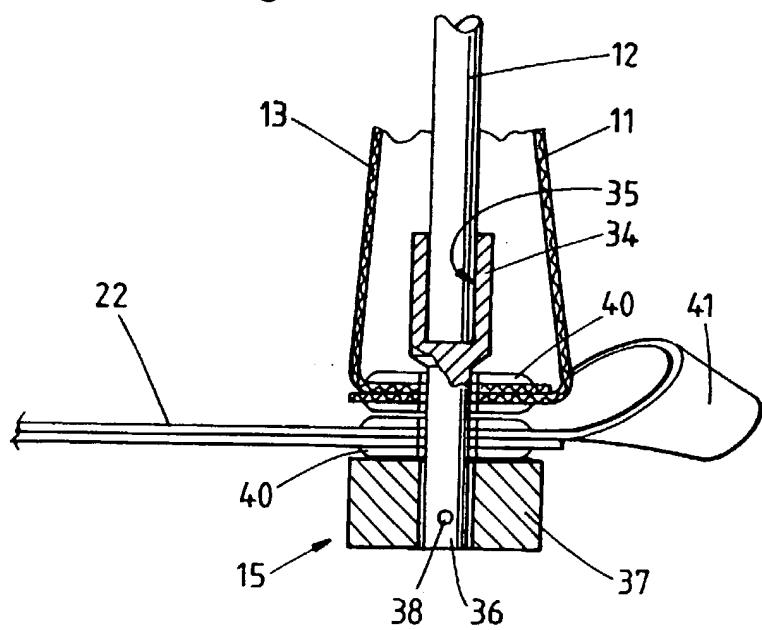
- a. removing said loops from a flat circular carry bag;
- b. disengaging said buckle portions at said central location to thereby separate said loops;
- c. interconnecting two pairs of said foot assemblies on ends of respective said flexible rods by buckle engagement of said ground straps which thereby draw said foot assemblies of each pair towards one another and modify the shape of said shelter from its foldable state to its erected state; and
- d. joining said edges of fabric sheets of said shelter with said fastening means along contiguous edges to thereby retain said edges in two pairs and complete erection of the foldable shelter.

**FIG 1****FIG 2**

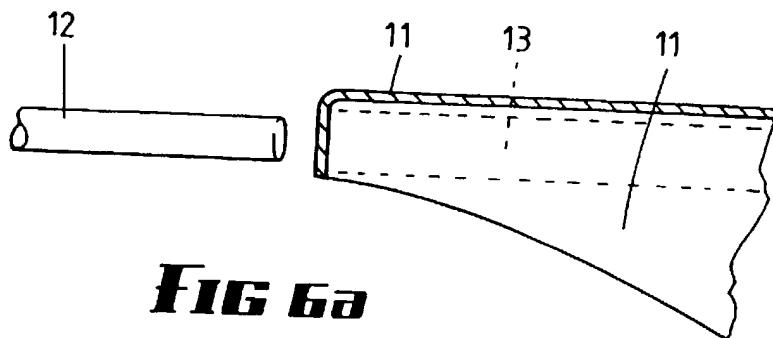
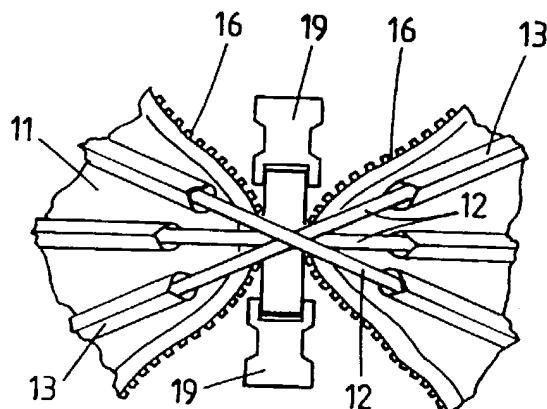
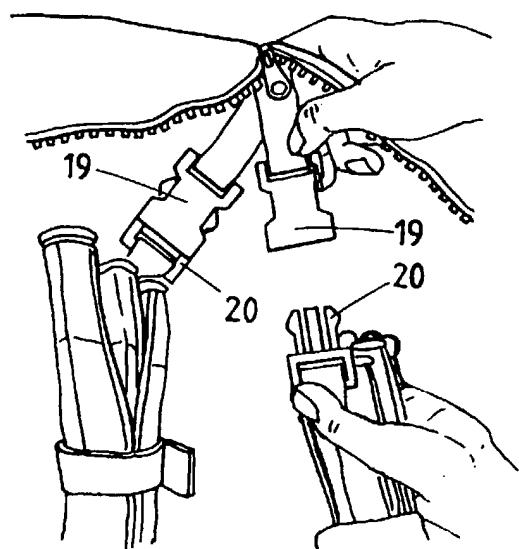
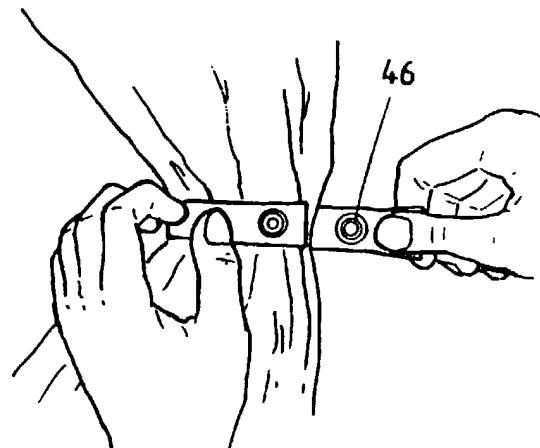
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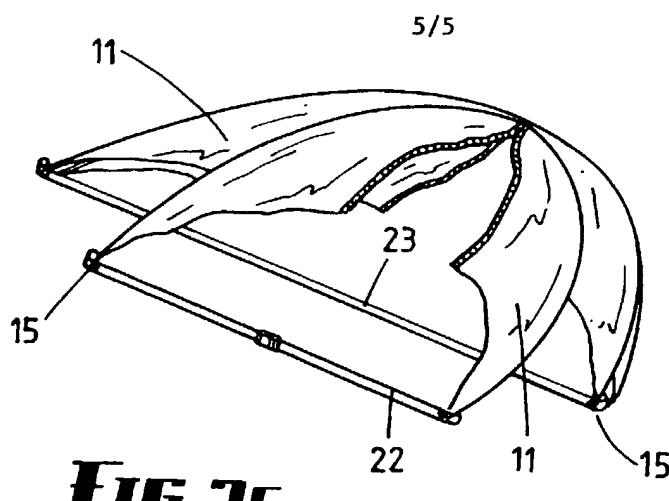
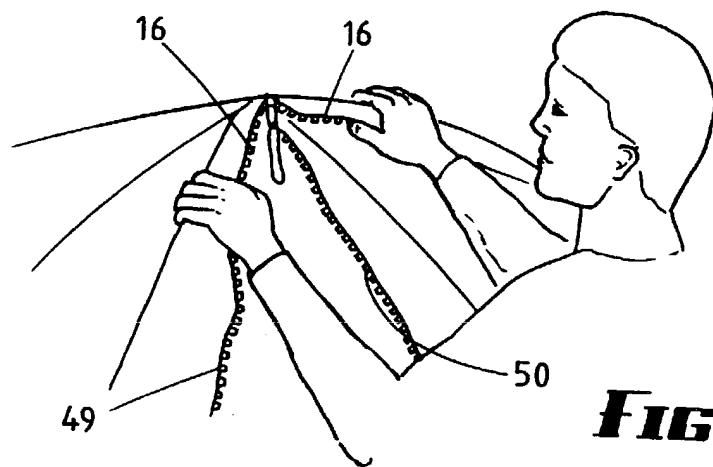
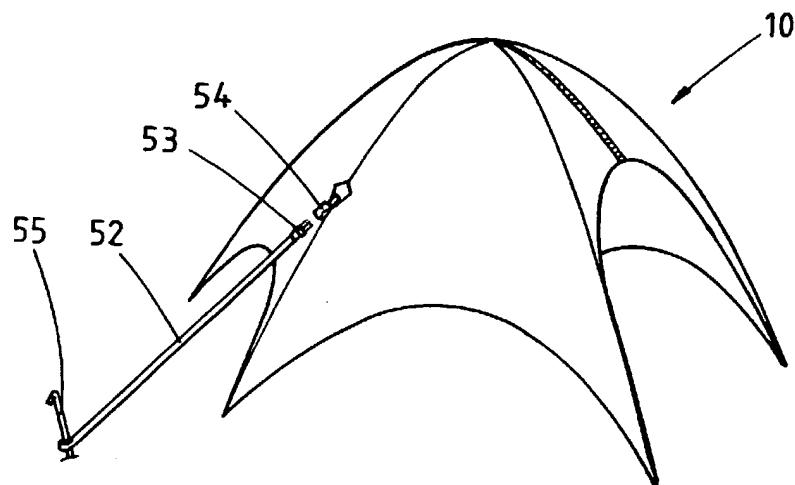
**FIG 3****FIG 4**

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**FIG 5a****FIG 5b**

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**FIG 6a****FIG 6b****FIG 7a****FIG 7b**

**FIG 7c****FIG 7d****FIG 7e**

# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/AU 95/00835

## A. CLASSIFICATION OF SUBJECT MATTER

Int Cl<sup>6</sup>: E04H 15/40, 15/44, 15/58

According to International Patent Classification (IPC) or to both national classification and IPC

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5370145 A (WU) 6 December 1994 See figure 1.	
A	US 4766918 A (ODEKIRK) 30 August 1988 See figure 2.	
A	IS 4352362 A (NICHOLS) 5 October 1982 See figure 1.	

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**INTERNATIONAL SEARCH REPORT**

International Application No.

PCT/AU 95/00835

<b>C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
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A	US 3146784 A (SILVER) 1 September 1964 See figure 1.	
A	DE 3013178 A (BECKER) 19 November 1981 See figure.	
A	WO 91/02870 A (SPRING FORM INC) 7 March 1991 See figure	

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International Application No.

PCT/AU 95/00835

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Patent Document Cited in Search Report		Patent Family Member					
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US	4352362						
DE	3013178						
WO	9102870	AU	64081/90	CA	2065019	EP	487642
		US	5038812				

END OF ANNEX